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NEC Express5800/T110f-S Configuration Guide

Liquid cooling model

Introduction

This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC Express5800 server.

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NEC Corporation

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Technical Specification

Key Features

- Ultra compact form of 93mm in width, 13 liters in volume
- Up to 32 GB of high speed DDR3-1600 memory
- Full manageability by integrated EXPRESSSCOPE Engine 3
- Function in maximum 40° C / 104° F ambient temperature

Specification

Model		T110f-S		
Part Number		N8100-1984F		
Processor	Type	Intel® Xeon® processor E3-1220 v3	Intel® Xeon® processor E3-1230Lv3	Intel® Xeon® processor E3-1265Lv3
	Clock speed	3.10 GHz	1.80 GHz	2.50GHz
	Number of Processors	1		
	Cache	8MB		
	Cores and Threads	4C / 4T	4C / 8T	
Chipset		Intel® C224 Chipset		
Memory	Type	DDR3-1600 ECC Unbuffered DIMM		
	Standard Capacity	0 GB		
	Maximum Capacity	32 GB (4 x 8 GB)		
Internal Storage	Standard Capacity	0 GB		
	Maximum Capacity	8 TB (2 x 4 TB)		
	Disk Controller	SATA : 6Gb/s (Integrated)		
	RAID	SATA : RAID 0/1/10 (Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)		
	Hot Plug	Supported (When using N8154-59F or N8154-59F/-56F)		
	Optical Disk Drive	Optional		
	3.5-inch Media Bays	1		
	Disk Drive Bays	2 or 4 or 6		
Expansion Slots		Total: 4 slots available 1 PCIe 3.0 x16 (x16 connector) 3 PCIe 2.0 x4 (x8 connector)		
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)		
	Resolution / Color	1280 x 1024 / 16.7M [2]		
Interfaces		1 VGA (15-pin mini D-sub,1 rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2 rear) 4 USB3.0 (1 front, 2 rear, 1 internal) 4 USB2.0 (1 front, 2 rear, 1 internal) 2 1000BASE-T LAN connector (RJ-45, 2 rear) 1 100BASE-TX LAN connector for Management (RJ-45, 1 rear)		
Server Management		EXPRESSSCOPE Engine 3		
System Fan		Standard		
Power Supply		1 x 250 Watt 80 PLUS® Platinum certified non-Hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz		

Model		**T110f-S**		
Power Consumption	**(Max. Config, Idling)**	114 VA / 97 Watt	114 VA / 97 Watt	113 VA / 96 Watt
	(Max. Config, Operating)	206 VA / 192 Watt	156 VA / 144 Watt	183 VA / 170 Watt
Acoustic Noise (Sound Pressure Level) [3]	**Minimum Config.**	32.2 dB	29.1 dB	
	Maximum Config.	38.2 dB	38.1 dB	
Dimensions (W x D x H)		98.0 x 386.5 x 341.0 mm / 3.9 x 15.2 x 13.4 in		
Weight (Minimum / Maximum)		8 kg / 11 kg, 17.64 lbs. / 24.25 lbs.		
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C / 50° to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%		
Regulatory and Safety		FCC, CE, UL, CB, RoHS, BSMI, CCC, RCM, WEEE		
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2008 x86 Standard Microsoft® Windows Server® 2008 x86 Enterprise Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard Microsoft® Windows Server® 2012 Datacenter Red Hat Enterprise Linux 5.9 or later [4] Red Hat Enterprise Linux 5.9 or later (EM64T) [4] Red Hat Enterprise Linux 6.4 or later [4] Red Hat Enterprise Linux 6.4 or later (EM64T) [4] VMware ESXi™ 5.1 Update 1		

1 Embedded SATA RAID controller is supported only on Windows operating systems.

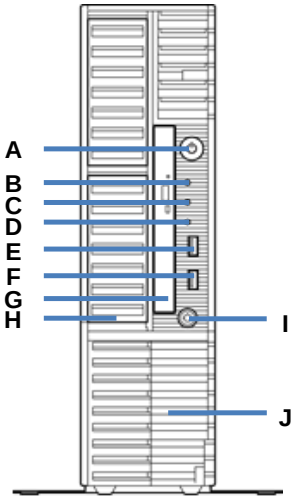
2 Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

3 Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

4 For Linux support, contact your sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

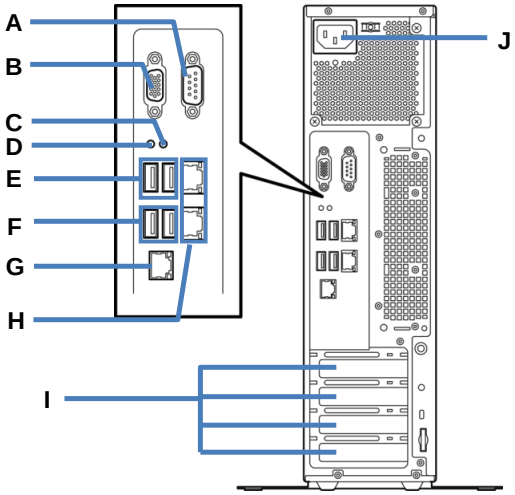
External Views

Front View



Legend			
A.	Power Button	**F.**	USB 2.0 Connectors
B.	Power LED	**G.**	Optical Disk Drive
C.	Drive Activity LED	**H.**	3.5-inch Media Bay
D.	System Status LED	**I.**	Drive Bay Cover Key
E.	USB 3.0 Connectors	**K.**	Drive Bay Cover

Rear Views

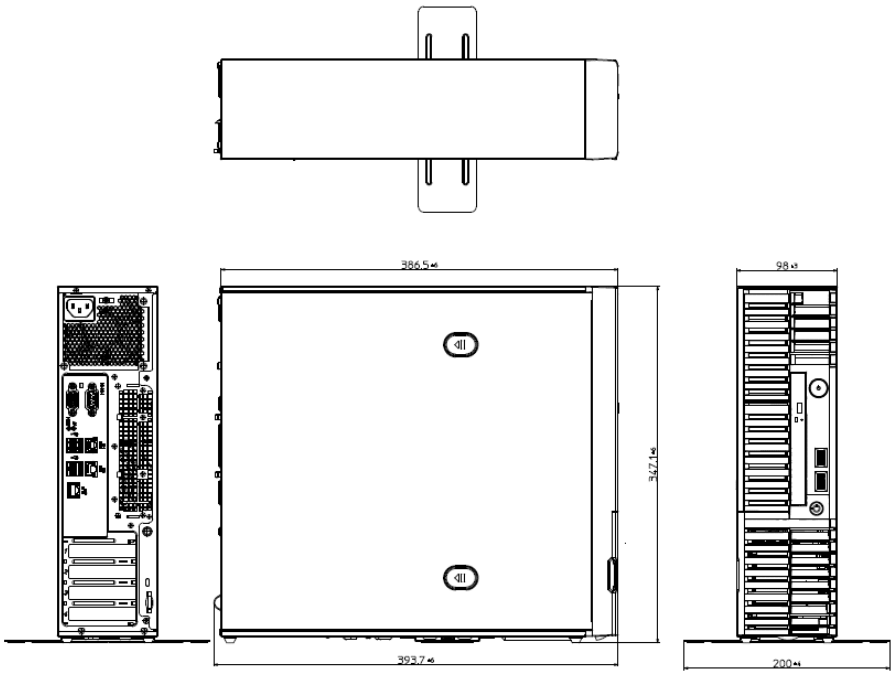


Legend			
A.	Serial Port (A) Connector	**F.**	USB 3.0 Connector
B.	VGA Connector	**G.**	Management LAN Connector
C.	BMC Reset Switch	**H.**	Data LAN Connectors
D.	Dump (NMI) Switch	**I.**	PCI Slots (Low Profile)
E.	USB 2.0 Connector	**J**	AC Inlet

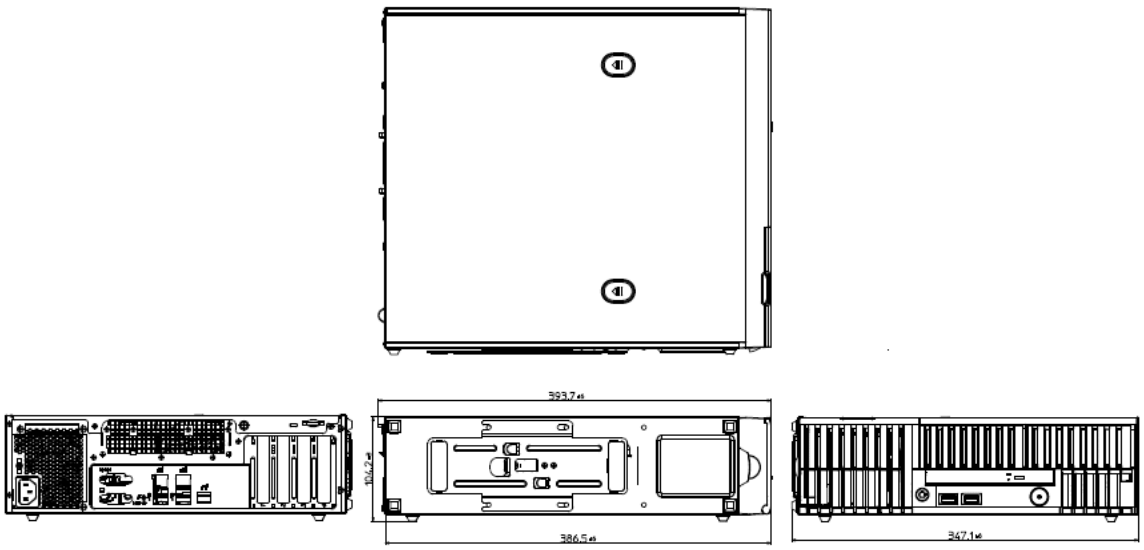
Dimensions (mm)

Standard Bezel

Tower Orientation

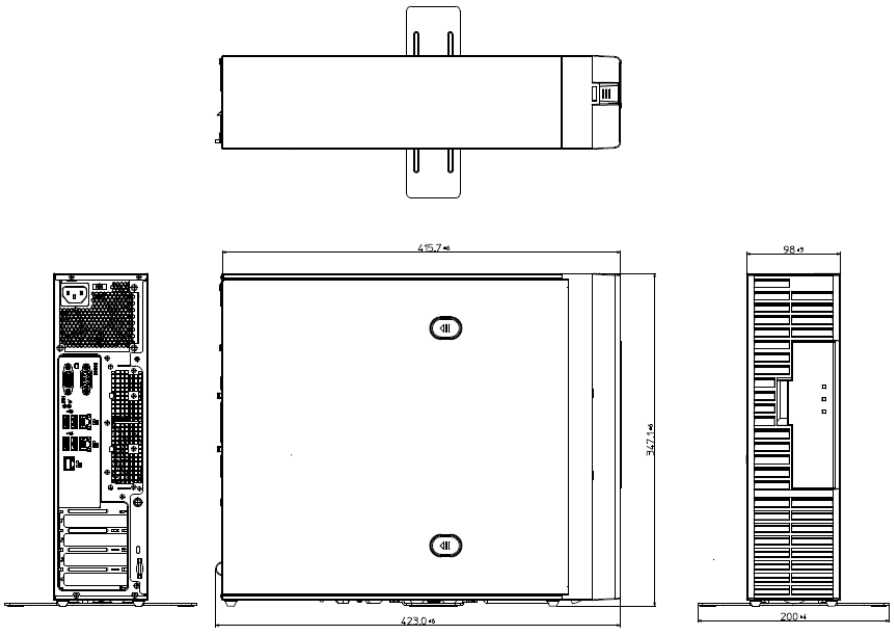


Desktop Orientation

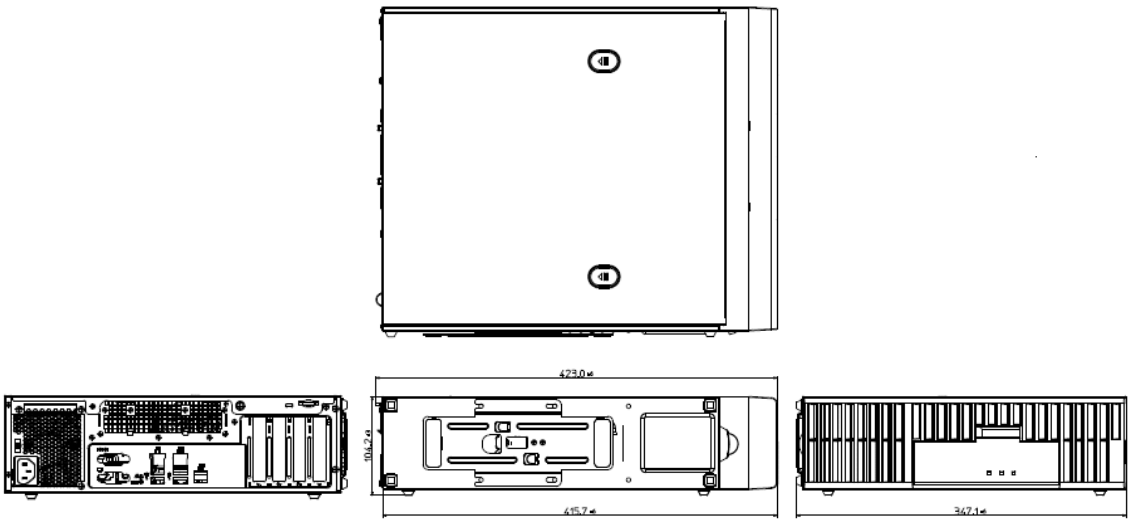


Dust Proof Bezel

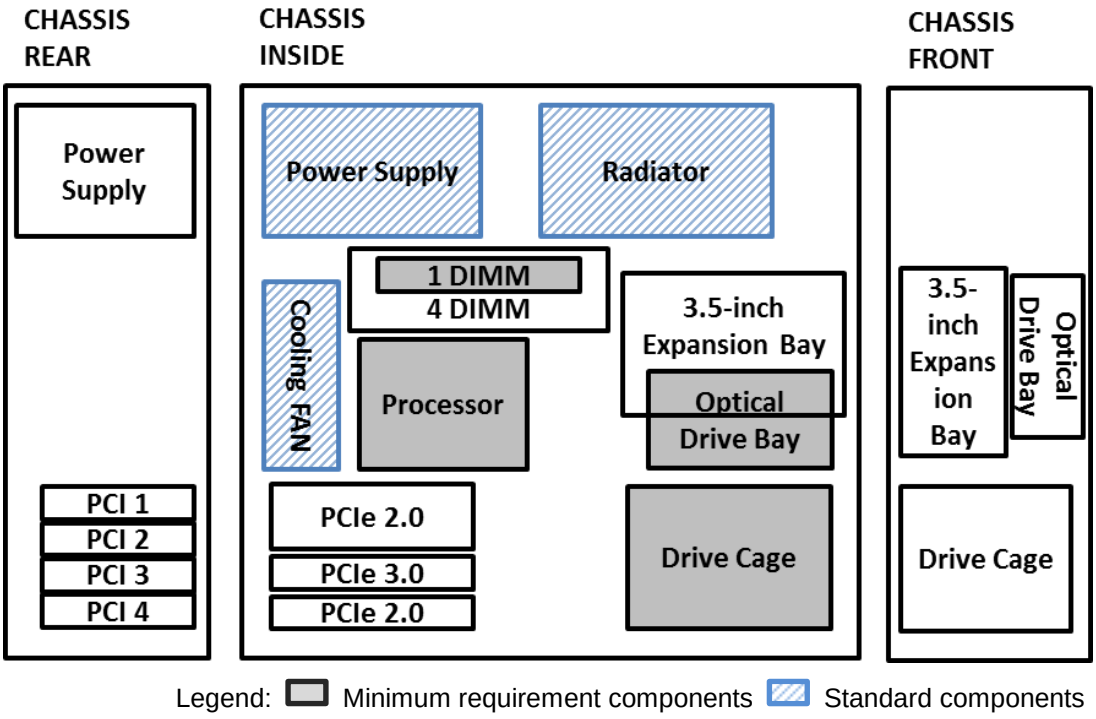
Tower Orientation



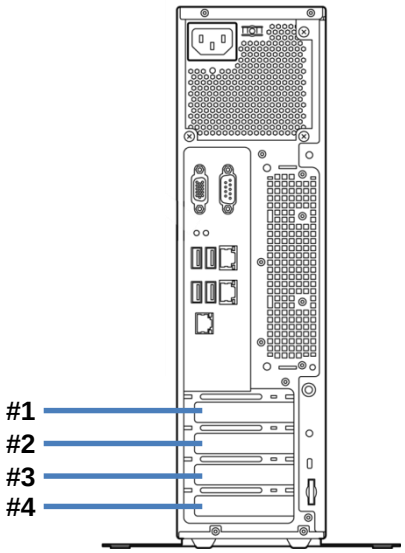
Desktop Orientation



Configuration Diagram



Expansion Slots



Legend	
#1	PCIe 2.0 x1, x8 connector, Low Profile, up to 168mm length
#2	PCIe 2.0 x1, x8 connector, Low Profile, up to 168mm length
#3	PCIe 3.0 x16, x16 connector, Low Profile, up to 168mm length
#4	PCIe 2.0 x4, x8 connector, Low Profile, up to 168mm length

Server Configuration

1 Base Models

Product Name / Description	Part Number
NEC Express5800/T110f-S no Processor, no RAM, no Drive Cage, no HDD, no Optical Drive Including: 250 Watt non-hot plug power supply, EXPRESSBUILDER DVD	N8100-1984F

2 Processor

Available sockets: 1

Category	Product Name / Description	Part Number
Processors Required	**Xeon E3-1220 v3 Processor Kit** Intel® Xeon ® Processor E3-1220 v3 (3.10 GHz, 4C/4T, 8 MB)	N8101-626F
	Xeon E3-1230L v3 Processor Kit Intel® Xeon ® Processor E3-1230L v3 (1.80 GHz, 4C/8T, 8 MB)	N8101-627F
	Xeon E3-1265L v3 Processor Kit Intel® Xeon ® Processor E3-1265L v3 (2.50 GHz, 4C/8T, 8 MB)	N8101-629F

NOTE:

- One processor kit from above must be installed.

3 Memory

Available slots: 4

Product Name / Description	Part Number
2GB DDR3-1600 UNB Memory Kit 2GB Unbuffered ECC DIMM, DDR3L-1600(PC3-12800)	N8102-523F
4GB DDR3-1600 UNB Memory Kit 4GB Unbuffered ECC DIMM, DDR3L-1600(PC3-12800)	N8102-524F
8GB DDR3-1600 UNB Memory Kit 8GB Unbuffered ECC DIMM, DDR3L-1600(PC3-12800)	N8102-525F

NOTE:

- Minimum one memory kit must be installed.
- To install by double of memory kit is recommended in order to increase memory transfer speed by dual-channel symmetric configuration.

Maximum Available Memory

See the table below for the maximum memory size that you can actually use on your system.

The maximum available memory is less than the maximum physical memory supported by your system because some chipsets require PCI resource space of about 750MB. PCI resource requirements vary depending on the type and the number of PCI cards you are using.

Maximum Memory Size Supported by Operating Systems		Maximum Available Memory
Microsoft Windows Server 2008 Standard	**4 GB**	**4 GB(HW-DEP enabled)** **App. 3.5 GB (HW-DEP disabled)**
Microsoft Windows Server 2008 R2 Standard	**32 GB**	**32 GB**
Microsoft Windows Server 2008 Enterprise	**64 GB**	**32 GB**
Microsoft Windows Server 2008 R2 Enterprise	**2 TB**	**32 GB**
Microsoft Windows Server 2012 Standard Microsoft Windows Server 2012 Datacenter	**4 TB**	**32 GB**
Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6	**16 GB**	**16 GB**
Red Hat Enterprise Linux 5 (EM64T)	**1 TB**	**32 GB**
Red Hat Enterprise Linux 6 (x86_64)	**3 TB**	**32 GB**
VMware ESXi 5.1 [1]	**2 TB**	**32 GB**

[1] Up to 1 TB of the main memory is available to each virtual machine.

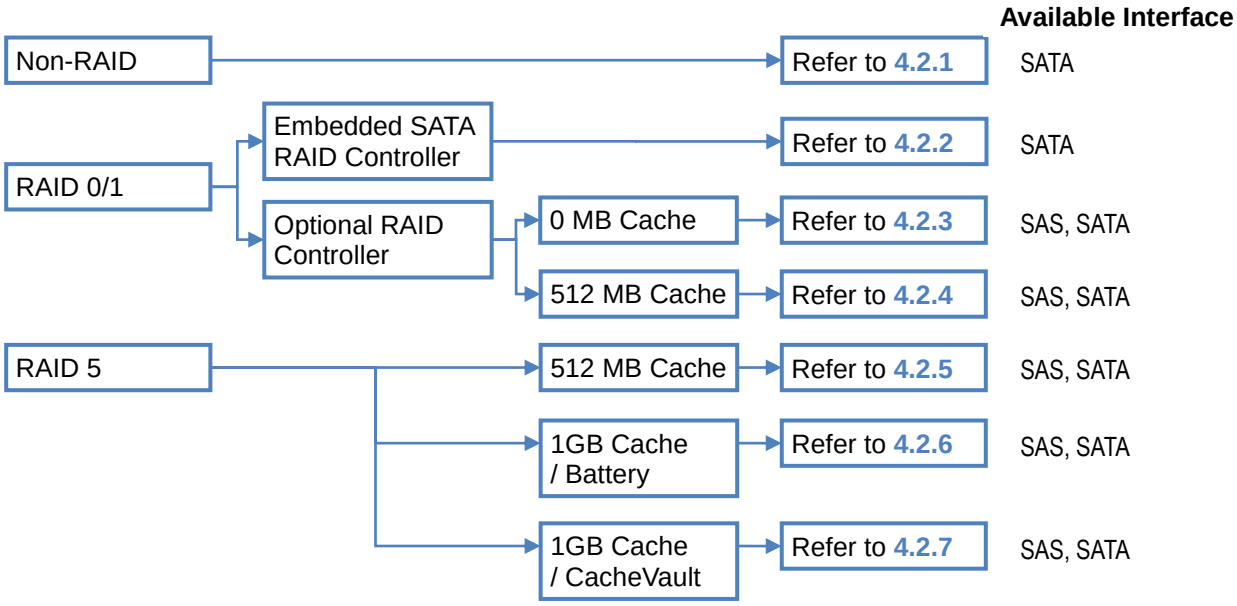
4 Internal Hard Disk Drives

4.1 RAID Configuration

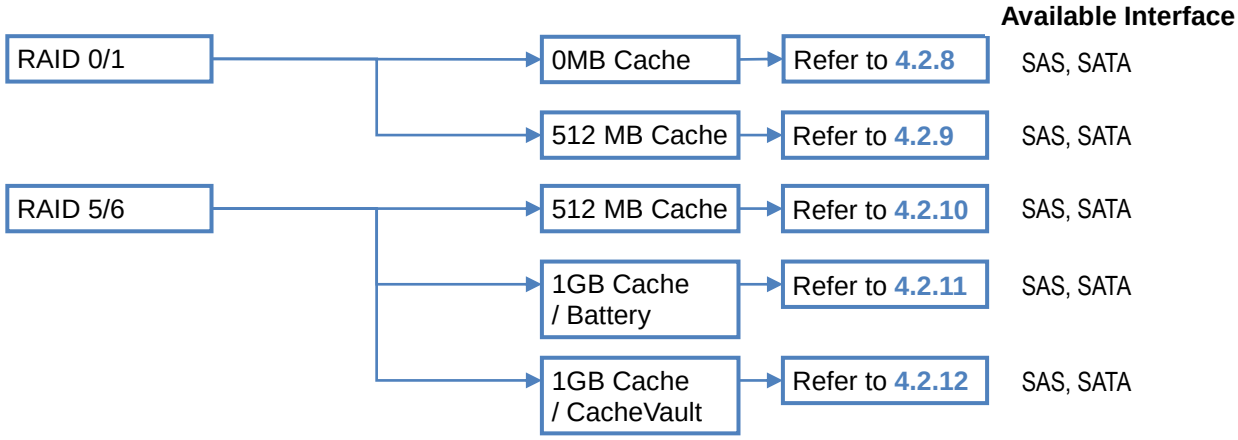
Refer to the section in accordance with your disk form factor and RAID configuration

4.1.1 2.5-inch Drive

Up to four Drives



Up to six Drives

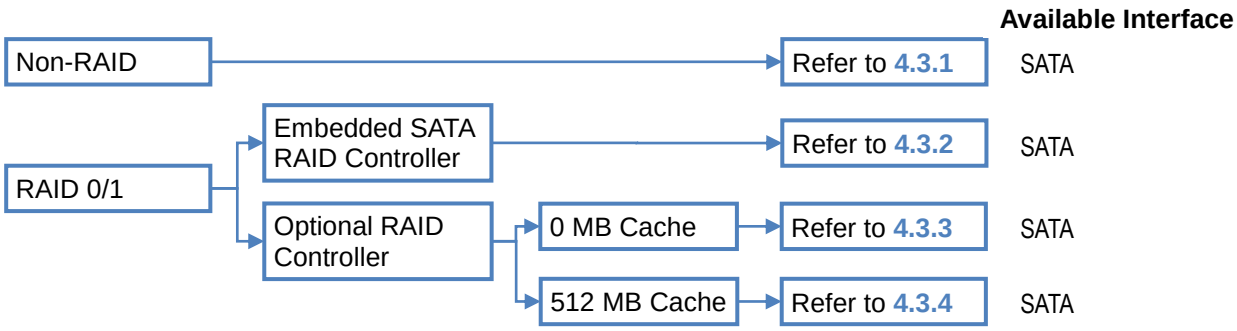


NOTE:

- No tape drive can be installed when installing an optional 2.5-inch drive cage.
- Hot plug insertion/removal is not supported with the embedded SATA non-RAID controller.
- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- Up to two kinds of drives can be mixed in a system.
- All drives within a RAID array should be of the same capacity and rotation speed.
- Mixing SAS and SATA hard drives in the same drive cage is not supported.
- All drives within a drive cage should be of the same rotation speed.

4.1.2 3.5-inch Drive

Up to two 3.5-inch Drives



Up to two 3.5-inch Drives plus two 2.5-inch Drives

NOTE:

- No tape drive can be installed when installing an optional 2.5-inch drive cage.
- Hot plug insertion/removal is not supported on the 3.5-inch drive configuration.
- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- All hard drives within a RAID array should be of the same capacity and rotation speed.
- All drives within a RAID array should be of the same capacity and rotation speed.

4.2 2.5-inch Drive Configuration

4.2.1 Up to four Drives with Embedded SATA Controller

Category		Product Name / Description	Part Number
Storage Controller		**Embedded SATA Controller** 4x 6Gb/s SATA	(Standard)
Cable		**Internal SATA Cable** Mini-SAS to mini-SAS	(Standard)
Drive Cage **Required**		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Drive **4 slots available**	**SATA HDD**	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE

- Hot plug insertion/removal is not supported with the embedded SATA non-RAID controller.

4.2.2 Up to four Drives with Embedded SATA RAID Controller

Category		Product Name / Description	Part Number
Storage Controller		**Embedded SATA Controller** 4x 6Gb/s SATA, RAID0/1/10 capable	(Standard)
Cable		**Internal SATA Cable** miniSAS to miniSAS	(Standard)
Drive Cage **Required**		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Drive **3 slots available**	**SATA**	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE

- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- All hard drives within a RAID array should be of the same capacity and rotation speed.

4.2.3 Up to four Drives with RAID 0/1 Controller with 0 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (0MB, RAID 0/1)** LSI MegaRAID SAS 9240-8i RAID0/1/10, 0MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-171
Cable		**Internal SATA Cable** Mini-SAS to mini-SAS	(Standard)
Drive Cage Required		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Drive 4 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed..

4.2.4 Up to four Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID0/1/10, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable		**Internal SAS/SATA Cable** Mini-SAS to mini-SAS	(Standard)
Drive Cage Required		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Drive 3 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.2.5 Up to four Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable		**Internal SAS/SATA Cable** Mini-SAS to mini-SAS	(Standard)
Drive Cage Required		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Drive 4 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.2.6 Up to four Drives with RAID 5 Controller with 1 GB Cache/Battery

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** Mini-SAS to mini-SAS	(Standard)
Drive Cage Required		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Drive 4 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed..

4.2.7 Up to four Drives with RAID 5 Controller with 1 GB Cache/CacheVault

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-167
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SATA Cable** Mini-SAS to mini-SAS	(Standard)
Drive Cage Required		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Drive 4 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.2.8 Up to six Drives with RAID 0/1 Controller with 0 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (0MB, RAID 0/1)** LSI MegaRAID SAS 9240-8i RAID0/1/10, 128MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 3Gb/s	N8103-171
Cable		**Internal SATA Cable** mini-SAS to mini-SAS, miniSAS to 2x Single SATA	(Standard)
Drive Cage Required		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Optional Drive Cage Required		**2.5-Inch Hot Plug Drive Cage Kit** 2x 2.5-inch hot plug drive bays Including 1x mini-SAS to 2x Single SATA cable	N8154-56F
Drive 6 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.2.9 Up to six Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID0/1/10, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable		**Internal SATA Cable** mini-SAS to mini-SAS, miniSAS to 2x Single SATA	(Standard)
Drive Cage Required		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Optional Drive Cage Required		**2.5-Inch Hot Plug Drive Cage Kit** 2x 2.5-inch hot plug drive bays Including 1x mini-SAS to 2x Single SATA cable	N8154-56F
Drive 6 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.

4.2.10 Up to six Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable		**Internal SATA Cable** mini-SAS to mini-SAS, miniSAS to 2x Single SATA	(Standard)
Drive Cage Required		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Optional Drive Cage Required		**2.5-Inch Hot Plug Drive Cage Kit** 2x 2.5-inch hot plug drive bays Including 1x mini-SAS to 2x Single SATA cable	N8154-56F
Drive 6 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.2.11 Up to six Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SATA Cable** mini-SAS to mini-SAS, miniSAS to 2x Single SATA	(Standard)
Drive Cage Required		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Optional Drive Cage Required		**2.5-Inch Hot Plug Drive Cage Kit** 2x 2.5-inch hot plug drive bays Including 1x mini-SAS to 2x Single SATA cable	N8154-56F
Drive 6 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.2.12 Up to six Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-167
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SATA Cable** mini-SAS to mini-SAS, miniSAS to 2x Single SATA	(Standard)
Drive Cage Required		**2.5-inch Drive Cage** 4 x 2.5-inch hot plug drive bays	N8154-59F
Optional Drive Cage Required		**2.5-Inch Hot Plug Drive Cage Kit** 2x 2.5-inch hot plug drive bays Including 1x mini-SAS to 2x Single SATA cable	N8154-56F
Drive 6 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.3 3.5-inch Drive Configuration

4.3.1 Up to two Drives with Embedded SATA Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 4x 6Gb/s SATA	(Standard)
Cable Required	**Internal SAS/SATA Cable** miniSAS to 2x Single SATA	K410-278(00)

Drive Cage **Required**	**3.5-inch Drive Cage** 2 x 3.5-inch non hot plug (fixed) drive bays	N8154-65F
Drive **2 slots available**	**500GB 7.2K non-Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-359
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-360
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-361

4.3.2 Up to two Drives with Embedded SATA RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 4x 6Gb/s SATA, RAID0/1/10 capable	(Standard)
Cable **Required**	**Internal SATA Cable** mini-SAS to 2x Single SATA	K410-278(00)
Drive Cage **Required**	**3.5-inch Drive Cage** 2 x 3.5-inch non hot plug (fixed) drive bays	N8154-65F
Drive **2 slots available**	**500GB 7.2K non-Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-359
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-360
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-361
	3TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 3TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-362
	4TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-396

NOTE:

- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- All hard drives within a RAID array should be of the same capacity.

4.3.3 Up to two Drives with RAID 0/1 Controller with 0 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (0MB, RAID 0/1)** LSI MegaRAID SAS 9240-8i RAID0/1/10, 0MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-171
Cable Required	**Internal SATA Cable** mini-SAS to 2x Single SATA	K410-277(00)
Drive Cage Required	**3.5-inch Drive Cage** 2 x 3.5-inch non hot plug (fixed) drive bays	N8154-65F
Drive 2 slots available	**500GB 7.2K non-Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-359
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-360
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-361

NOTE:

- All hard drives within a RAID array should be of the same capacity.

4.3.4 Up to two Drives with RAID 0/1 Controller with 512 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID0/1/10, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended	**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable Required	**Internal SATA Cable** mini-SAS to 2x Single SATA	K410-277(00)
Drive Cage Required	**3.5-inch Drive Cage** 2 x 3.5-inch non hot plug (fixed) drive bays	N8154-65F
Drive 2 slots available	**500GB 7.2K non-Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-359
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-360
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-361
	3TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 3TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-362
	4TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-396

NOTE:

- All hard drives within a RAID array should be of the same capacity.

4.3.5 3.5-inch and 2.5-inch Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID0/1/10, 512 MB, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-155
Cable Required		**Internal SATA Cable** mini-SAS to 2x Single SATA, for 3.5-inch drive cage	K410-277(00)
Cable Required		**Internal SAS/SATA Cable** mini-SAS to 2x Single SATA, for 2.5-inch drive cage	K410-287(00)
3.5-inch Drive Cage Required		**3.5-inch Drive Cage** 2 x 3.5-inch non hot plug (fixed) drive bays	N8154-65F
2.5-inch Drive Cage Required		**2.5-inch Drive Cage** 2 x 2.5-inch non hot plug (fixed) drive bays	N8154-56F
3.5-inch Drive 2 slots available		**500GB 7.2K non-Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-359
		1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-360
		2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-361
		3TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 3TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-362
		4TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-396
2.5-inch Drive 2 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 1x 1.2 TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All hard drives within a RAID array should be of the same form factor, capacity and rotation speed.

5 Internal Optical Drive

Category	Product Name / Description	Part Number
Internal 1 slot available Required	**Internal Slim DVD-ROM drive** Slim DVD-ROM drive	N8151-119
	Internal DVD Super Multi Drive Slim DVD Super Multi drive, not including writing software	N8151-107F
	Optical Drive Bay Cover Blank panel	N8151-121
External	**External DVD-ROM drive** DVD-ROM drive, Bus powered, 1.2 A required	N8160-91

NOTE:

- Up to 1 optical drive can be connected.
- N8151-121 Optical Drive Bay Cover must be installed when not installing any internal optical drives.

6 Internal RDX Drive

Category	Product Name / Description	Part Number
Controller	**Internal USB Controller** 1 x USB port	(Standard)
Cable Required	**Internal USB cable** 1x Internal USB to 1x USB device	K410-276(00)
Drive 1 bays available	**Internal RDX (USB)**	N8151-105

7 PCI Card

7.1 Network Interface Controller

Category	Product Name / Description	Part Number
GbE	**1000BASE-T Adapter** Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-138
	Dual Port 1000BASE-T Adapter Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-132

NIC Teaming feature – NIC Teaming and bonding features

See the table below for supported network interfaces and OS combinations.

Windows Server 2008 support BASP (Broadcom Advanced Server Program) teaming while Windows Server 2012 and Linux support teaming with bonding function supported by OS.

Network Interface	Team	OS
GbE NIC Embedded 1GbE NIC and N8104-138/-132	Up to four teams per one system Up to four ports per one team	Windows Server 2008 Windows Server 2008 R2 Window Server 2012 Red Hat Linux

Using iSCSI

See the table below for supported network interfaces and OS combinations.

Category	Network Interface	Operating Systems
GbE	Embedded 1GbE NIC	Windows Server 2008 R2, Windows Serer 2012, RHEL*, VMware
	N8104-138	Windows Server 2008 R2, Windows Serer 2012, RHEL*, VMware
	N8104-132	Windows Server 2008 R2, Windows Serer 2012, RHEL*, VMware

* RHEL: Red Hat Enterprise Linux

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.

7.2 SAS Controller

Product Name / Description	Part Number
SAS Controller LSI SAS9212-4i4e Host Bus Adapter 6Gb/s SAS, Int. 4 / Ext. 4, 7-pin SATA / SFF-8088, PCIe 2.0 x8	N8103-142

7.3 Serial Port Adapter

Product Name / Description	Part Number
Serial Port Adapter Serial port fixed to PCI bracket	N8117-01A

NOTE:

- Up to one Serial Port Adapter can be installed.

8 Other Add-in Components

8.1 Trusted Platform Module Kit

Product Name / Description	Part Number
Trusted Platform Module Kit TPM 1.2 module	N8115-15

NOTE:

- The kit is not available in China.
- The kit is not removable after attachment.
- "TPM Support" in BIOS setup menu must be activated prior to use of this kit.
- To use Windows BitLocker drive encryption, be sure to keep the "recovery password" of BitLocker function. The recovery password is required to restore data for hardware replacement during a system error.

8.2 Internal Flash Memory

Available socket: 1

Product Name / Description	Part Number
Internal Flash Memory Internal flash memory to enable software and tools in the EXPRESSBUILDR DVD without DVD media **NOTE:** - Before use, software and tools must be copied from the EXPRESSBUILDER DVD to the flash memory. - The following operations can be performed with the flash memory: - Installation of Windows server with express setup - Installation of Starter Pack—the package of NEC qualified drivers and system setting tools - Installation of NEC ESMPRO Agent and Universal RAID Utility - Performance of the Test and Diagnosis Tool	N8115-14

8.3 Flash FDD

Choose the Flash FDD if you need to prepare an alternative device for a floppy drive.

Product Name / Description	Part Number
Flash FDD USB flash emulating USB floppy disk, Native capacity 1.44 MB	N8160-86

NOTE:

- Up to one derive can be connected

8.4 Input Devices

Product Name / Description	Part Number
Keyboard and Mouse Pack (US) 1 x 104-keys White USB keyboard, 1 x USB White Optical Wheel Mouse	(Standard)

9 Add-on Components

9.1 Server Management License

The server integrates the EXPRESSSCOPE Engine 3 as standard. Refer to **Server Management** for the standard management features. For more extensive remote KVM and remote media features, choose the following kit.

Product Name / Description	Part Number
Remote KVM and Media License Kit License for one server. Remote KVM and remote media are enabled regardless of OS status. Remote KVM: - Displays a graphics console on the web browser of the remote terminal (PC/server). - Controls keyboard and mouse via the remote terminals' web browser Remote media: Enables the user to use the CD / DVD / FD / Flash memory of the remote terminals (PC/server) as if accessing the local drives.	N8115-04

NOTE:

- Remote KVM and remote media features are not available for virtual machines.

9.2 Rack Conversion Kit

Product Name / Description	Part Number
Rack Conversion Kit Convert to 3U form factor	N8143-94

9.3 Dust Proof Kit

The server supports the dust resistant feature. Choose the following kit to install the system in dusty places.

Category	Product Name / Description	Part Number
Front Bezel	**Dust Proof Bezel with Sensor** Including 1 set of filter replacement sensors, 1 set of dust proof filters	N8146-39
Filter	**Dust proof filter (5 pcs.)** For N8146-39 Dust Proof filter Removal capacity of particles : Up to 1 μm-sized	N8147-23

9.4 Tamper Proof Power Button Covers

Product Name / Description	Part Number
Tamper Proof Cover Tamper proof cover to prevent erroneous operation of a power button	N8146-42

9.5 Medium and Cartridge

Category	Product Name	Drive supported	Part Number
RDX	RDX Cartridge (320GB)	N8151-105	N8153-01
	RDX Cartridge (500GB)	N8151-105	N8153-02
	RDX Cartridge (1TB)	N8151-105	N8153-03
	RDX Cartridge (1.5TB)	N8151-105	N8153-04

References

Server Management

The EXPRESSSCOPE Engine 3, integrated into the server, provides superior remote control and system management features listed in the table below.

		Standard	With Remote KVM and Media License kit
Hardware monitoring	Temperature/hard drive[1]/fan/voltage/power consumption/ System LAN/degeneration/ (memory/hard drive[1])	✓	✓
	Hardware configuration information collection	✓	✓
	Hardware event log collection	✓	✓
Boot monitoring	BIOS/POST stall, Booting, OS stall, shutdown	✓ [3]	✓ [3]
Alerting	HW error, Boot error and OS panic (by SNMP, E-Mail)	✓	✓
Remote KVM (via LAN)	POST/BIOS setup, ROM utility	✓ [2]	✓
	Panic screen, Boot screen	✓ [2,4,5]	✓
	CUI-based screen (OS console)	✓ [2,5]	✓
	GUI-based screen (OS console)	-	✓
	Remote screen recording	-	✓
Remote control (via LAN)	Remote reset/power on-off/ dump	✓	✓
	Remote power cSapping	✓	✓
	BIOS/BMC FW update	✓	✓
	Remote BIOS setup(partial configuration only)	✓	✓
	OS shutdown	✓ [3]	✓ [3]
	Remote media (CD/DVD/FD/USB)	-	✓
	CLP (Command Line Protocol) (DMTF compliant)	✓	✓
	Remote control via Web browser (multi user login at the same time)	✓	✓
	Scheduling (without UPS, require NEC ESMPRO Manager)	✓ [3]	✓ [3]
Maintenance	EXPRESSSCOPE® Profile key (Backup/restore BIOS/BMC setup information)	✓	✓
Others	Set automatic IP address via DNS/DHCP	✓	✓
	LDAP/Active Directory verification/user control	✓	✓
	Clock synchronization of main unit and the RTC	✓	✓
	Access log collection	✓	✓
Industry Standard	IPMI support	2.0	2.0

1 The feature is not supported on non-hot plug 3.5-inch drive.
2 The standard serial port is not available for the feature.
3 The feature is not supported on VMware systems.
4 Monitoring boot screens is not supported on VMware systems.
5 In VMware systems, only the direct console user interface is supported.

OS Support Matrix for PCI Cards and Embedded Controllers

Part Number	Product Name	WS 2012	WS 2008R2	WS 2008	WS 2008 x64	RHEL 6	RHEL 6 x64	RHEL 5	RHEL 5 x64	VMware ESXi 5.1
-	Embedded SATA non-RAID Controller	✓	✓	✓	-	✓	✓	✓	✓	✓
-	Embedded SATA RAID Controller	-	✓	✓	-	-	-	-	-	-
-	Embedded 1GbE NIC	✓	✓	✓	-	✓	✓	✓	✓	✓
N8103-142	SAS Controller	✓	✓	✓	-	✓	✓	✓	✓	✓
N8103-171	RAID Controller (0MB,RAID 0/1)	✓	✓	✓	-	✓	✓	✓	✓	-
N8103-149	RAID Controller (512MB, RAID 0/1)	✓	✓	✓	-	✓	✓	✓	✓	✓
N8103-150	RAID Controller (512MB, RAID 0/1/5/6)	✓	✓	✓	-	✓	✓	✓	✓	✓
N8103-151	RAID Controller (1GB, RAID 0/1/5/6)	✓	✓	✓	-	✓	✓	✓	✓	✓
N8103-167	RAID Controller (1GB, RAID 0/1/5/6)	✓	✓	✓	-	✓	✓	✓	✓	✓
N8104-138	1000BASE-T Adapter (1ch)	✓	✓	✓	-	✓	✓	✓	✓	✓
N8104-132	1000BASE-T Adapter (2ch)	✓	✓	✓	-	✓	✓	✓	✓	✓

Supported PCI cards and Installable Slots

		Slots			
Part Number	Product Name	#1	#2	#3	#4
N8103-142	SAS Controller	-	✓	✓	✓
N8103-171	RAID Controller (0MB,RAID 0/1)	-	-	-	✓
N8103-149	RAID Controller (512MB,RAID 0/1)	-	-	-	✓
N8103-150	RAID Controller (512MB,RAID 0/1/5/6)	-	-	-	✓
N8103-151	RAID Controller (1GB,RAID 0/1/5/6)	-	-	-	✓
N8103-167	RAID Controller (1GB, RAID 0/1/5/6)	-	-	-	✓
N8104-138	1000BASE-T Adapter (1ch)	✓	✓	✓	✓
N8104-132	1000BASE-T Adapter (2ch)	✓	✓	✓	✓
N8117-01A	Serial Port Adapter	✓	✓	✓	✓

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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.

The USB interface is not guaranteed to work properly for all USB devices.

Revision History

Revision	Date	Description
1.0	July 17, 2013	Initial release